SECTION 6.0

Fuel Supply

The Humboldt Bay Repowering Project (HBRP) will use ten Wärtsilä dual-fuel 18V50DF engines. The 18V50DF engine is capable of using both natural gas and liquid fuels (such as California Air Resources Board [CARB] diesel) for continuous operations. This section describes the HBRP's use of fuels and the facilities needed to supply the project with fuel.

6.1 Fuel Use

The HBRP's primary fuel will be natural gas. The Wärtsilä 18V50DF engines are designed to use more than one fuel, however. The HBRP will use CARB diesel as a secondary fuel that can be used in case of emergencies, or when natural gas is curtailed in accordance with PG&E's CPUC Gas Tariff Rule 14 during an emergency.

6.1.1 Natural Gas

The reciprocating engines will be designed to burn natural gas. Assuming a summer peak temperature of 67.5 degrees Fahrenheit (°F), the HBRP's fuel requirements would be approximately 139 million British thermal units per hour (MMBtu/hr), on a higher heating value (HHV) basis, per unit.

The HBRP is located approximately 145 pipeline miles from Pacific Gas and Electric Company's (PG&E's) nearest backbone transmission pipeline. The facility will use gas from a spur line from this backbone pipeline, and will also use gas from wells at nearby Tomkins Hill. Natural gas will be delivered to the site via an existing 10-inch gas pipeline. A new 10-inch ultrasonic meter will be installed at the existing regulation site for the HBRP. Gas will be supplied with a minimum pressure of 170 to 350 pounds per square inch gauge (psig) immediately downstream of the meter set. Pressure will be reduced in one step to between 90 and 95 psig. The natural gas will flow through gas scrubber/filtering equipment and a gas pressure control station prior to entering the reciprocating engines.

In accordance with PG&E's CPUC Tariff Rule 14, current natural gas supply limitations in Humboldt County require the existing plant to reduce gas usage when average temperature drops below 50 °F, which mainly occurs during the winter months (December through March). When this takes place, the existing plant generally switches to a backup fuel, No. 6 fuel oil or merely curtails load on one or two of the steam turbines and runs the Mobile Emergency Power Plants, which burn distillate fuel. The most recent curtailment took place on August 19, 2006, when Unit 2 was switched to backup fuel for a short period of time due to a rupture of the spur gas transmission line that supplies the Eureka area. Temporary repairs were completed in less than 24 hours. Permanent repairs may require the existing plant to run on liquid fuels for a few weeks.

In the event that the HBRP were required to curtail natural gas use during the winter months, the facility could switch to a liquid fuel on one or more of the 10 engines as required. In order to accommodate this contingency, the project has been designed to have

dual fuel capability, and will have a 4-day backup supply of liquid fuel. PG&E is not proposing operation under liquid fuel for economic dispatch.

6.1.2 CARB Diesel Fuel

Diesel fuel meeting CARB standards[1] will be used both as pilot fuel and as the alternative fuel in the event natural gas supply is restricted. The Wärtsilä dual-fuel engines have two different injection systems; one for each fuel mode. In natural gas mode, the engine uses a micro-pilot injection system. Unlike older model dual-fuel engines which typically used up to 5 percent liquid fuel in natural gas mode, the Wärtsilä 18V50DF injects a very small amount of pressurized liquid fuel (0.7 percent) into the combustion chamber, so that it spontaneously flashes to ignite the air-gas fuel mixture and initiate the engine's combustion cycle. This minimal use of liquid fuel makes it possible to minimize air emissions.

In liquid fuel mode, a conventional injection system is used to allow for the engine to run on diesel or bio-diesel fuels. Fuel flexibility and high efficiency are the main advantages of the dual-fuel technology. The Wärtsilä 18V50DF engine model has shown an efficiency of over 48 percent.

As noted above, the project will have a 4-day backup supply of liquid fuel (assuming an average output of 100 megawatts [MW]) on site (634,000 gallons), with interconnecting and re-circulation piping for the engine fuel oil system.

Pilot fuel consumption would reach a maximum of 75 gallons per hour, assuming that the pilot fuel provides 0.7 percent of the total heat input, and that all 10 engines are operating at 100 percent load (163 MW net).

6.2 Construction

The HBRP will not require construction of an off-site pipeline to supply natural gas to the project site. The existing site is served by a 10-inch-diameter natural gas pipeline that connects with the project site at a gas regulating station along the eastern margins of the property. The pipe connecting the new HBRP power plant with the existing line will be 10 inches in diameter. Construction will primarily use an open trench method and will not extend off of the project site. No alternative routes were evaluated because the existing line is within the project parcel. Appendix 6A contains a letter from PG&E's gas department indicating their capacity to serve the project.

The pipeline will be constructed of carbon steel in accordance with the American Petroleum Institute (API) specification for gas pipeline. The pipe will have factory-applied corrosion-protection coating. Joints will be welded, inspected using x-ray, and wrapped with a corrosion-protection coating.

[1] All vehicular diesel fuel sold in California after June of 2006 must meet the California Air Resources Board (CARB) specifications for sulfur content (less than 15 parts per million [ppm] by weight), per California Code of Regulations, Title 13, Section 2281(a)(2).

6.3 Regulating Station

Gas will be supplied with a minimum pressure of 170 to 350 psig immediately downstream of the meter set. Pressure will be reduced in one step to between 90 and 95 psig.

6.4 Pipeline Operations

The proposed natural gas supply pipeline will be designed, constructed, operated, and maintained in accordance with 49 Code of Federal Regulations (CFR) 192 and California Public Utility Commission (CPUC) General Order No. 112. Specifically, the pipeline will be designed in accordance with the standards required for gas pipelines in populated areas. It will be installed with a minimum of 36 inches of cover as required by the Code of Federal Regulations.

PG&E's standard operations and maintenance plan will be in place, addressing both normal procedures and conditions and any upset or abnormal conditions that could occur. Periodic leak surveys and cathodic protection surveys will be performed along the pipeline, as required by 49 CFR 192. The pipeline will be continuously protected by a cathodic protection system. PG&E's standard emergency plan will provide for prompt and effective responses to upset conditions detected along the pipeline or reported by the public. This plan is reviewed with local agencies annually.

6.5 References

49 CFR 192. *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*.

American Petroleum Institute (API). 1999. *Welding of Pipelines and Related Facilities*. ANSI/API 1104, 19th edition. September.

California Public Utilities Commission (CPUC). CPUC General Order No. 112: Design, Construction, Testing, Maintenance and Operation of Utility Gas Gathering, Transmission and Distribution Piping Systems.